

Name \_\_\_\_\_

# Dividing Decimals by 10, 100, and 1,000

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Being able to divide a decimal by 10, 100, and 1,000 *mentally* is an extremely valuable skill to have. You'll soon see how really easy it is to divide decimals by these numbers.

To learn this easy strategy, watch what happens to the decimal point in the examples below.

$$\begin{aligned} 24.6 \div 10 &= 2.4.6 \\ 24.6 \div 100 &= .24.6 \\ 24.6 \div 1,000 &= .024.6 \end{aligned}$$

**STRATEGY:** The decimal point is moved as many places to the **LEFT** as there are zeroes in the 10's, 100's, or 1,000's.

Notice that the answers are smaller because you are dividing by a whole number. Also, notice that dividing by 10 is the same as multiplying by  $\frac{1}{10}$ . Dividing by 100 is the same as multiplying by  $\frac{1}{100}$ . Dividing by 1,000 is the same as multiplying by  $\frac{1}{1,000}$ .

Use your new strategy to divide mentally.

1.  $364 \div 10 =$  \_\_\_\_\_

2.  $364 \div 100 =$  \_\_\_\_\_

3.  $364 \div 1,000 =$  \_\_\_\_\_

4.  $25.48 \div 10 =$  \_\_\_\_\_

5.  $25.48 \div 100 =$  \_\_\_\_\_

6.  $25.48 \div 1,000 =$  \_\_\_\_\_

7.  $1.85 \div 10 =$  \_\_\_\_\_

8.  $46.4 \div 100 =$  \_\_\_\_\_

9.  $5.13 \div 1,000 =$  \_\_\_\_\_

10.  $.5 \div 10 =$  \_\_\_\_\_

11.  $4.33 \div 100 =$  \_\_\_\_\_

12.  $\$1.10 \div 10 =$  \_\_\_\_\_

13.  $12.6 \div 1,000 =$  \_\_\_\_\_

14.  $8.37 \div 100 =$  \_\_\_\_\_

15.  $\$128.00 \div 100 =$  \_\_\_\_\_

16.  $8,634 \div 1,000 =$  \_\_\_\_\_

17.  $489.7 \div 10 =$  \_\_\_\_\_

18.  $556.8 \div 1,000 =$  \_\_\_\_\_

19.  $\$2,867.00 \div 100 =$  \_\_\_\_\_

20.  $89 \div 100 =$  \_\_\_\_\_

21.  $\$9,860.00 \div 1,000 =$  \_\_\_\_\_

22.  $9.8 \div 100 =$  \_\_\_\_\_

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# Dividing Decimals by .1, .01, and .001

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To learn a *quick* and *easy* strategy for dividing by .1, .01, and .001, look at the examples below. Observe the movement of the decimal point.

$$\begin{aligned} 5.23 \div .1 &= 52.3 \\ 5.23 \div .01 &= 523.0 \\ 5.23 \div .001 &= 5230.0 \end{aligned}$$

**STRATEGY:** The decimal point is moved to the **RIGHT** as many decimal places as there are in .1, .01, .001.

Notice that the answers are larger because you are dividing by a smaller quantity. Also, notice that dividing by .1 is the same as multiplying by 10. Dividing by .01 is the same as multiplying by 100. Dividing by .001 is the same as multiplying by 1,000.

Use your new strategy to divide *mentally*.

1.  $1.84 \div .1 =$  \_\_\_\_\_
2.  $1.84 \div .01 =$  \_\_\_\_\_
3.  $1.84 \div .001 =$  \_\_\_\_\_
4.  $34.7 \div .1 =$  \_\_\_\_\_
5.  $34.7 \div .01 =$  \_\_\_\_\_
6.  $34.7 \div .001 =$  \_\_\_\_\_
7.  $458 \div .1 =$  \_\_\_\_\_
8.  $458 \div .01 =$  \_\_\_\_\_
9.  $458 \div .001 =$  \_\_\_\_\_
10.  $36 \div .1 =$  \_\_\_\_\_
11.  $4.8 \div .01 =$  \_\_\_\_\_
12.  $367.2 \div .10 =$  \_\_\_\_\_
13.  $8.84 \div .001 =$  \_\_\_\_\_
14.  $.96 \div .01 =$  \_\_\_\_\_
15.  $.230 \div .001 =$  \_\_\_\_\_
16.  $.45 \div .10 =$  \_\_\_\_\_
17.  $.78 \div .01 =$  \_\_\_\_\_
18.  $2.46 \div .01 =$  \_\_\_\_\_
19.  $3.42 \div .001 =$  \_\_\_\_\_
20.  $.05 \div .01 =$  \_\_\_\_\_
21.  $.4 \div .1 =$  \_\_\_\_\_
22.  $.036 \div .001 =$  \_\_\_\_\_
23.  $14.1 \div .01 =$  \_\_\_\_\_
24.  $6 \div .1 =$  \_\_\_\_\_



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# Decimal Division with a Potpourri of Strategies

*Mentally* dividing a decimal by a *whole number* and dividing a decimal by a *decimal* involves **A POTPOURRI OF STRATEGIES**.

Here are some strategies to keep in mind:

\* Look for number facts:  $3 \overline{)1.2}$ ,  $6 \overline{)1.8}$ ,  $.6 \overline{)3.6}$

\* Think about where the decimal points are placed.

in the dividend:  $.7 \overline{)2.1}$ ,  $.05 \overline{)25.5}$

in the quotient:  $6 \overline{)1.2}$ ,  $4 \overline{).016}$

\* Think about where the zeroes are placed.

in the dividend:  $.08 \overline{)1.6}$

in the dividend to even out an answer:  $5 \overline{)1.40}$

in the quotient:  $4 \overline{).16}$

*Mentally* compute the answers to the decimal division below. Use your strategies.

1.  $5 \overline{)4.5}$       2.  $6 \overline{).36}$       3.  $7 \overline{).420}$       4.  $3 \overline{).021}$       5.  $4 \overline{)8.044}$

6.  $5 \overline{)5.010}$       7.  $2 \overline{)4.0012}$       8.  $5 \overline{)1.4}$       9.  $4 \overline{).02}$       10.  $20 \overline{)4.0}$

11.  $80 \overline{)6.40}$       12.  $90 \overline{).72}$       13.  $30 \overline{)6.030}$       14.  $50 \overline{)15.0}$       15.  $.7 \overline{)2.1}$

16.  $.7 \overline{).21}$       17.  $.07 \overline{).21}$       18.  $.08 \overline{).32}$       19.  $.08 \overline{)3.2}$       20.  $.8 \overline{).32}$

21.  $.6 \overline{)4.2}$       22.  $.7 \overline{).49}$       23.  $.07 \overline{).56}$       24.  $.07 \overline{)3.5}$       25.  $.3 \overline{)1.8}$

26.  $.9 \overline{).018}$       27.  $.4 \overline{).0404}$       28.  $2.5 \overline{)5}$       29.  $.14 \overline{)2.8}$       30.  $.18 \overline{)3.6}$

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# Analyzing 1%, 10%, and 100% of a Number

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WHAT IS 8% OF 600?

DO THIS MENTALLY.

WHAT IS 58% OF 600?

DO THIS MENTALLY.

Hard questions? Definitely **NOT**! These are *easy* when you know the information in the examples below. It's remarkable what you can do with basic information!


**EXAMPLES:**

$$100\% \text{ of } 600 = 600$$

$$10\% \text{ of } 600 = 60$$

$$1\% \text{ of } 600 = 6$$

Answer the following questions based on the information in the examples.

1. What is 100% of 600? \_\_\_\_\_
2. What is 2% of 600? \_\_\_\_\_
3. What is 50 % of 600? \_\_\_\_\_
4. What is 3% of 600? \_\_\_\_\_
5. What is 10% of 600? \_\_\_\_\_
6. What is 15% of 600? \_\_\_\_\_
7. What is 5% of 600? \_\_\_\_\_
8. What is 8% of 600? \_\_\_\_\_
9. What is 1% of 600? \_\_\_\_\_
10. What is 23 % of 600? \_\_\_\_\_
11. What is  $\frac{1}{2}\%$  of 600? \_\_\_\_\_
12. What is 41% of 600? \_\_\_\_\_
13. What is 200% of 600? \_\_\_\_\_
14. What is 58% of 600? \_\_\_\_\_
15. What is 20% of 600? \_\_\_\_\_
16. What is  $1\frac{1}{2}\%$  of 600? \_\_\_\_\_
17. What is 30% of 600? \_\_\_\_\_
18. What is  $10\frac{1}{2}\%$  of 600? \_\_\_\_\_
19. What is 40% of 600? \_\_\_\_\_
20. What is  $99\frac{1}{2}\%$  of 600? \_\_\_\_\_
21. What is 60% of 600? \_\_\_\_\_
22. What is 95% of 600? \_\_\_\_\_

At what point did you stop looking at the chart?



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# Percents and Fraction Equivalents: A Time Saver



## CHANGING FRACTIONS TO PERCENTS

\* When written as a fraction with a denominator of 100, some percents can be renamed easily as fractions with familiar denominators such as  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{10}$ ,  $\frac{1}{20}$  and  $\frac{1}{50}$ .  
Some examples are:  $35\% = \frac{35}{100} = \frac{7}{20}$ ;  $48\% = \frac{48}{100} = \frac{12}{25}$ .

\* There are three fraction/percent equivalents you need to **memorize**.

$$\frac{1}{8} = 12\frac{1}{2}\% \quad \frac{1}{3} = 33\frac{1}{3}\% \quad \frac{1}{6} = 16\frac{2}{3}\%$$

Mentally change the fractions below to percents. Use what you know about the unit fraction.

**EXAMPLE:** If you know that  $\frac{1}{25} = 4\%$ , then  $\frac{9}{25}$  is  $9 \times 4$  or  $36\%$ .

- |   |   |   |   |
|---|---|---|---|
| 1. $\frac{1}{2} = \underline{\hspace{1cm}}\%$   | 2. $\frac{1}{4} = \underline{\hspace{1cm}}\%$               | 3. $\frac{1}{8} = \underline{\hspace{1cm}}\%$               | 4. $\frac{1}{6} = \underline{\hspace{1cm}}\%$               |
| 5. $\frac{1}{3} = \underline{\hspace{1cm}}\%$   | 6. $\frac{2}{4} = \frac{1}{2} = \underline{\hspace{1cm}}\%$ | 7. $\frac{2}{8} = \frac{1}{4} = \underline{\hspace{1cm}}\%$ | 8. $\frac{2}{6} = \frac{1}{3} = \underline{\hspace{1cm}}\%$ |
| 9. $\frac{2}{3} = \underline{\hspace{1cm}}\%$   | 10. $\frac{3}{4} = \underline{\hspace{1cm}}\%$              | 11. $\frac{3}{8} = \underline{\hspace{1cm}}\%$              | 12. $\frac{5}{6} = \underline{\hspace{1cm}}\%$              |
| 13. $\frac{1}{10} = \underline{\hspace{1cm}}\%$ | 14. $\frac{1}{5} = \underline{\hspace{1cm}}\%$              | 15. $\frac{1}{50} = \underline{\hspace{1cm}}\%$             | 16. $\frac{7}{25} = \underline{\hspace{1cm}}\%$             |
| 17. $\frac{2}{10} = \underline{\hspace{1cm}}\%$ | 18. $\frac{2}{5} = \underline{\hspace{1cm}}\%$              | 19. $\frac{11}{50} = \underline{\hspace{1cm}}\%$            | 20. $\frac{1}{20} = \underline{\hspace{1cm}}\%$             |
| 21. $\frac{8}{10} = \underline{\hspace{1cm}}\%$ | 22. $\frac{4}{5} = \underline{\hspace{1cm}}\%$              | 23. $\frac{1}{25} = \underline{\hspace{1cm}}\%$             | 24. $\frac{13}{20} = \underline{\hspace{1cm}}\%$            |

\* Remember to think of the fraction as the percent over 100 and then put it into the best form.

\* Remember to make use of the fraction/percent equivalents;  
for example:  $28\% = \frac{28}{100} = \frac{7}{25}$ .

Mentally change the percents to fractions.

- |                                       |  |                                       |                                       |
|---------------------------------------|--|---------------------------------------|---------------------------------------|
| 25. $35\% = \underline{\hspace{1cm}}$ | 26. $66\frac{2}{3}\% = \underline{\hspace{1cm}}$ | 27. $75\% = \underline{\hspace{1cm}}$ | 28. $22\% = \underline{\hspace{1cm}}$ |
| 29. $40\% = \underline{\hspace{1cm}}$ | 30. $87\frac{1}{2}\% = \underline{\hspace{1cm}}$ | 31. $48\% = \underline{\hspace{1cm}}$ | 32. $12\% = \underline{\hspace{1cm}}$ |
| 33. $15\% = \underline{\hspace{1cm}}$ | 34. $83\frac{1}{3}\% = \underline{\hspace{1cm}}$ | 35. $70\% = \underline{\hspace{1cm}}$ | 36. $55\% = \underline{\hspace{1cm}}$ |
| 37. $24\% = \underline{\hspace{1cm}}$ | 38. $16\frac{2}{3}\% = \underline{\hspace{1cm}}$ | 39. $68\% = \underline{\hspace{1cm}}$ | 40. $8\% = \underline{\hspace{1cm}}$  |

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# Using Fractional Equivalents and Role Reversal

What is **ROLE REVERSAL**?

**ROLE REVERSAL** is changing the problem around to produce an easier set of operating numbers.

**EXAMPLE:** 18% of 50 can be mentally changed to 50% of 18, or  $\frac{1}{2}$  of 18.

This works because  $18\% \text{ of } 50 = \frac{18}{100} \times \frac{50}{1}$ , or  $\frac{18}{1} \times \frac{50}{100}$

$18 \times 50\%$  is the same as  $18 \times \frac{1}{2} = 9$ .

Use fractional equivalents to do the examples below mentally. Use **ROLE REVERSAL** where it is helpful.

1. 50% of 400 = \_\_\_\_\_

2. 75% of 40 = \_\_\_\_\_

3. 60% of 35 = \_\_\_\_\_

4.  $16\frac{2}{3}\%$  of \$42. = \_\_\_\_\_

5. 30% of 20 = \_\_\_\_\_

6.  $33\frac{1}{3}\%$  x 24 = \_\_\_\_\_

7. 80% x 30 = \_\_\_\_\_

8. 12% of 75 = \_\_\_\_\_

9. 44% of 50 = \_\_\_\_\_

10. 25% of 84 = \_\_\_\_\_

11. 14% x 50 = \_\_\_\_\_

12. 55% x \$200. = \_\_\_\_\_

13. 36% x \$25. = \_\_\_\_\_

14. 65% x 100 = \_\_\_\_\_

You can use this same idea with decimals.

15. .08 x \$125. = \_\_\_\_\_

16. .60 x 80 = \_\_\_\_\_

17. .48 x 75 = \_\_\_\_\_

18.  $.87\frac{1}{2}$  x 64 = \_\_\_\_\_

19. .90 x 40 = \_\_\_\_\_

20.  $.37\frac{1}{2}$  x 32 = \_\_\_\_\_